

Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference YG2003-64PCT	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/JP2004/000258	International filing date (day/month/year) 15.01.2004	Priority date (day/month/year) 16.01.2003
International Patent Classification (IPC) or national classification and IPC H05H 1/46, H01L 21/31, 21/265, 21/3065, C23C 16/505		
Applicant JAPAN SCIENCE AND TECHNOLOGY AGENCY		

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>8</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>																									
<p>4. This report contains indications relating to the following items:</p> <table><tr><td><input checked="" type="checkbox"/></td><td>Box No. I</td><td>Basis of the report</td></tr><tr><td><input type="checkbox"/></td><td>Box No. II</td><td>Priority</td></tr><tr><td><input type="checkbox"/></td><td>Box No. III</td><td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td></tr><tr><td><input type="checkbox"/></td><td>Box No. IV</td><td>Lack of unity of invention</td></tr><tr><td><input checked="" type="checkbox"/></td><td>Box No. V</td><td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td></tr><tr><td><input type="checkbox"/></td><td>Box No. VI</td><td>Certain documents cited</td></tr><tr><td><input type="checkbox"/></td><td>Box No. VII</td><td>Certain defects in the international application</td></tr><tr><td><input type="checkbox"/></td><td>Box No. VIII</td><td>Certain observations on the international application</td></tr></table>		<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
<input checked="" type="checkbox"/>	Box No. I	Basis of the report																							
<input type="checkbox"/>	Box No. II	Priority																							
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability																							
<input type="checkbox"/>	Box No. IV	Lack of unity of invention																							
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement																							
<input type="checkbox"/>	Box No. VI	Certain documents cited																							
<input type="checkbox"/>	Box No. VII	Certain defects in the international application																							
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application																							

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2004/000258

Box No. I

Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☒ the international application as originally filed/furnished
- ☐ the description:
- pages _____ as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ the claims:
- nos. _____ as originally filed/furnished
- nos.* _____ as amended (together with any statement) under Article 19
- nos.* _____ received by this Authority on _____
- nos.* _____ received by this Authority on _____
- ☐ the drawings:
- sheets _____ as originally filed/furnished
- sheets* _____ received by this Authority on _____
- sheets* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2004/000258

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-10, 12-27	YES
	Claims	11	NO
Inventive step (IS)	Claims	12-14	YES
	Claims	1-11, 15-27	NO
Industrial applicability (IA)	Claims	1-27	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Document 1: JP 9-270299 A (Frontec Inc.), 14 October 1997, paragraphs [0028] and [0032], and fig. 1 (Family: none)

Document 1 discloses a plasma generation device configured by connecting: at least two or more annular electrodes (2a, 2b and 2c) with different diameters, AC power supplies (3a and 3b) for applying AC power with different phases to the aforementioned annular electrodes (2a and 2b) disposed in adjacent positions, impedance adjustment circuits (9) that are disposed upon said electrodes, and high-frequency power sources (3a to 3c) that are provided at a ratio of one power source for the set of impedance adjustment circuits (9) that are disposed on the same electrode. In addition document 1 (paragraph [0032]) also indicates that "conventionally, it becomes more difficult to introduce electric power into the cylindrical electrodes (2) as the frequency increases; however, in the present example the provision of core lines (7) for the application of electric power at a plurality of locations and the provision of an impedance adjustment circuit (9) to each of the core lines (7) make it possible to uniformly apply high

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

frequency electric power to the cylindrical electrodes (2). In addition, decreasing the lengths of the core lines (7) which connect the cylindrical electrodes (2) and the impedance adjustment circuits (9) by opening holes in the magnetic members (4) makes it possible to apply the high-frequency electrical power with an absolute minimum of power loss. As a result of these configurations, it is possible to generate the plasma (14) with an approximately uniform plasma density within the cylindrical electrodes."

Document 2: JP 2002-12977 A (Mitsubishi Heavy Ind., Ltd.), 15 January 2002, paragraphs [0028] and [0047] to [0108], all drawings, (Family: none)

Document 2 indicates that "[0028]...during a surface treatment by means of plasma within the VHF band (30MHz to 300 MHz), it is thought that the increase in impedance along the power supply propagation path from the high-frequency power source to the electrodes and the irregularity thereof make it impossible to maintain the spatial uniformity of the plasma density."

Document 3: Naoki YAMAMOTO et al., "Multi Naibu Antenna Hoshiki wo Mochiita Daimenseki Yudo Ketsugo Plasma no Seisei," Journal of the High Temperature Society, Vol. 28, No. 4, pp. 13, 22 July 2002

Document 3 presents a plasma generation device

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

wherein antenna groups comprising 2 or 3 U-shaped internal antennas are introduced into the rectangular chamber from each of the side walls, and a high-frequency power source is connected to each of the antenna groups via a matching network.

Document 4: JP 2001-31662 A (Nihon Koshuha Co., Ltd.), 20 November 2001, paragraphs [0018] to [0026], (Family: none)

Document 4 discloses a uniform field distribution plasma processing device which is configured by disposing a plurality of elements around the periphery of the planar electrodes, electrically connecting said elements to said electrodes, supplying high-frequency electric power to said electrodes, and setting the impedance values of the elements so that the electric field of each of said electrodes has a uniform distribution; therein, said uniform field distribution plasma processing device applies three currents of high-frequency electric power which have different frequencies.

Document 5: JP 8-236294 A (JEOL Ltd.), 13 September 1996, entire text, all drawings, (Family: none)

Document 5 discloses a device for applying high-frequency plasma, wherein the high-frequency electric power from the high-frequency oscillator (1) is amplified by the first through third high-frequency amplifiers (6, 8 and 10), the impedances thereof are matched by means of the matching boxes (11, 13 and 15), and the electric power is applied to the electrodes (5) within the chamber

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

(4) .

Document 6: JP 2002-359232 A (Tokyo Electron Ltd.), 13
December 2002, entire text, all drawings,
(Family: none)

Document 6 discloses a plasma processing device which detects the plasma distribution within the processing container by means of a plurality of split counter electrodes while also positioning the split counter electrodes at optimal positions according to the detected state of the plasma.

Document 7: JP 62-273731 A (Tokyo Electron Ltd.), 27
November 1987, entire text, all drawings,
(Family: none)

Document 7 discloses a plasma processing device wherein plasma is generated by applying voltages that have different phases to the plurality of paired groups of plasma generation electrodes disposed within the processing container.

Document 8: JP 11-317299 A (Toshiba Corp.), 16 November
1999, paragraphs [0045] to [0046] and [0156]
to [0160], and fig. 2, 21 and 26 to 29, & US
6181069 B1 & US 6323595 B1

Document 8 discloses an internal rectilinear antenna which is configured from an antenna guide and a quartz pipe that covers the outer periphery of said antenna guide, wherein a space is provided between the

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

outer surface of said antenna guide and the inner surface of said quartz pipe.

Claim 11

The "technical feature of providing a space between the outer periphery of the antenna guide and the inner surface of the quartz pipe that covers the antenna guide in the invention set forth in the present application," which is indicated by the applicant in the written response dated 13 September 2004, is also disclosed in document 8. Therefore, document 8 discloses a configuration which corresponds to that of the invention set forth in claim 11, and it is thought that the "high frequency voltage generated by the antenna guide is applied to the sheath on the outer surface of the insulating member via static coupling" in the invention disclosed in document 8. Therefore, the assertions by the applicant in the written opinion are not applicable. Consequently, the invention set forth in claim 11 cannot be considered to be novel in the light of document 8.

Claims 1-11 and 15-27

In the written response, the applicant asserts that the technical issue of the present application is different from the technical issue that is indicated in the written opinion; however, both issues are substantially the same. That is to say, the issue wherein it becomes impossible to ignore the wavelength of the high frequency electric power when the frequency is constant but the large diameter of the plasma source or the like changes, which is disclosed in the written response, and the issue wherein it becomes impossible to

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2004/000258

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

ignore the wavelength of the high frequency electric power when the size of the plasma source is constant but the frequency increases, which is indicated in the written opinion, both simply use different expressions to describe the same issue, i.e., the issue wherein it becomes impossible to ignore the wavelength of the high frequency electric power. Therefore, with consideration of the fact that the claims of the present application do not delimit either the frequency or the dimensions, and the fact that the issues related to changes in the large diameter of the plasma source or the like are well known to a person skilled in the art, it is considered to be easy to configure the inventions set forth in claims 1-11 and 15-27 by combining the features that are disclosed in documents 1-8.

Consequently, the inventions set forth in claims 1-11 and 15-27 cannot be considered to involve an inventive step in the light of documents 1-8.